

the specification and particularly at page 6, lines 23-24, and page 7, lines 8-9 and 20-21.

The specification has been amended to correct obvious grammatical errors at page 1, line 8, at page 4, lines 12 and 18, and at page 13, line 10. No new matter has been added.

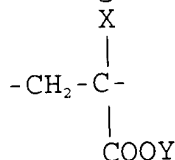
Copies of amended claims, replacement paragraphs and/or sections of the specification marked-up to show additions and deletions from previous versions are submitted herewith on separate sheets.

Rejections Under 35 U.S.C. §112

Claims 4 and 5 stand rejected under 35 U.S.C. §112, first paragraph in that the specification fails to enable "acrylic polymer". This rejection is respectfully traversed.

The term "acrylic polymer" is well understood in the art. According to Polymer Science Dictionary, Alger, M.S.M., Elsevier Applied Science, New York, (1990), p.5, (copy attached) acrylic polymer is defined as

A polymer with repeat units which can be considered as derivatives of acrylic or of a substituted acrylic acid, i.e., containing units of the type



where, most commonly, X=H (acrylic acid derivative) or X=CH₃ (methacrylic acid derivative).

The test of enablement under 35 U.S.C. §112 first paragraph is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. A patent need not teach, and preferably omits, what is well known in the art. See MPEP 2164.01. Applicants maintain that the level of skill in the art is such that one of ordinary skill would understand the term "acrylic polymer" and could make and use the invention as claimed.

The rejections under 35 U.S.C. §112 second paragraph are respectfully traversed for the following reasons.

Claims 1-10 and 29 stand rejected as being indefinite as to which surface of the body layer is textured. Amendment to claim 1 clarifies that the roughly textured face in line 1 is the antecedent for the roughly textured face in line 2, thus obviating the rejection.

Claim 1 stands rejected on assertion that the specification gives little or no specificity of the degree of uniformity of the "uniform thickness". The claim calls for the thickness of the cover layer to be "substantially uniform", i.e., not absolutely invariable. The degree of uniformity is further explained on page 6, lines 8-22 together with Figs. 2A and 2B. In comparison, a non-uniform thickness coating of the prior art is discussed in the paragraph bridging pages 4 and 5 and Figs. 1A and 1B. Also, the numerical thickness uniformity criteria of claims 6 and 7 have been amended into the specification. Applicants respectfully urge that the term "substantially uniform thickness" applied to the cover layer meets the requirements of 35 U.S.C. §112 second paragraph.

The rejection states that claim 1 fails to identify to which layer the "thickness" in the phrase "less than the thickness" in line 4 refers. The one and only antecedent for "thickness" in the claim is clearly indicated in line 3 (i.e., "the cover layer has a substantially uniform thickness"). Applicants fail to comprehend how the "thickness" in line 4 can be construed to apply to other than the cover layer thickness. This rejection should be withdrawn.

Claim 7 stands rejected because the phrase "varies at most" in line 2 is said to be unclear. The claim has been amended to clarify that the variation of thickness of the cover layer is not greater than 1 mm. The rejection is obviated.

Claims 9 and 10 were rejected for lack of clarity as to location of the second web. Claim 9 has been appropriately amended and the rejections should now be withdrawn.

Claim 29 stands rejected for the reason that the phrase "capable of" in line 4 was not deemed to be a definite limitation. To the contrary, the Patent Office has recognized that there is nothing inherently wrong with defining some part of an invention in functional terms. The Office specifically expressed approval of a claim limitation in the form: "capable of". See MPEP 2173.05(g) which identifies the phrase "incapable of forming a dye with a developing agent" to be a perfectly acceptable example. In the present case, the functional term "capable of curing to a solid" provides definite boundaries on the patent protection sought, especially in view of the disclosure at page 8, line 28 through page 9, line 8. Accordingly, Applicants submit that this rejection should be removed.

Rejections Under 35 U.S.C. §102

Claims 1 and 2 stand rejected as being anticipated by Hegg US 3,615,969. This rejection is respectfully traversed.

The Examiner asserts that Hegg discloses a foamed core laminate including a polyester skin with a fiberglass reinforcement over a polyurethane foam core and therefore anticipates the essential limitations of the claimed invention. Applicants disagree and maintain that Hegg does not disclose all of the invention defined by the claims.

The present invention concerns an insulation composite having a body layer and a substantially uniform thickness cover layer on one roughly textured face of the body layer. The body layer is embedded into the cover layer. At least two limitations of this invention are not disclosed by the reference, namely, the roughly textured surface and the substantially uniform thickness.

The Hegg patent concerns a reinforced laminate structure for construction material intended to replace wood or metal. At column 1, lines 63-67, the patent explains that the problem being solved involves a foamed polyurethane core of the laminate which develops a very smooth, slick surface or crust. The slickness

sheds, repels or rejects the adjacent layer of glass reinforced polyester skin usually applied directly over the foam core. Hegg's solution is to place a thin coating of polyester resin between the core and the skin before the crust completely cures. Some resin droplets puncture the foam crust and themselves cure to mechanically lock the resin to the foam. See col. 3, lines 38-43. The foam surface remains smooth, not roughly textured.

Hegg, further discloses that the thickness of the polyester resin layer is not critical. It is only necessary that all or a major portion of the underlying layer of foam be covered. See col. 3, lines 54-56. In other words, some portion of the foam layer can be uncoated and the coated portion need not be of uniform thickness. Hence, Hegg teaches away from the present invention.

Because Hegg does not disclose the coating of a roughly textured face of a substrate or that the coating thickness should be uniform, Applicants respectfully submit that the reference does not anticipate these claims.

Claims 1, 2, 6 and 9 stand rejected as being anticipated by Buzza et al. US 5,625,999. This rejection is respectfully traversed on the following grounds.

Buzza et al. relates to a roofing system comprising panels of sandwich structure. This structure comprises a gel coating applied to an interior mold surface, a bottom fiberglass skin applied to the then not fully cured gel coating, a bottom of a preformed foam core applied to the then not fully cured fiberglass skin. A top fiberglass skin is applied to the top of the preformed foam core and a top gel coating is applied to the top fiberglass skin to fully encapsulate the core. The fiberglass skin consists of a biaxial mat of glass and vinyl ester resin (col. 5, lines 13-30).

The claimed invention is fundamentally different from this structure in that the claimed body layer being coated has a roughly textured surface, the cover layer has a uniform thickness and the cover layer is embedded into the body layer to a depth which is a fraction of the cover layer thickness. These features

are shown in Figs. 2A and 2B. Buzza et al. calls for the successive layers to be bonded to each other (see col. 6, line 12). The bond is strengthened by adjacent layers being assembled before the bonding resin has fully set. However, Buzza et al. does not teach to embed the fiberglass skin into the foam core. This structure is perhaps best seen in Buzza et al. Fig. 3. That figure clearly shows the layers to be separated from each other by a defined interface.

The Examiner asserts that Buzza et al. discloses a thickness of 80 mils. This thickness refers to the fiberglass skin. More specifically, Buzza et al. teaches that the fiberglass skin thickness should be at least 75 mils (col. 5, line 16). Applicants calculate this minimum thickness dimension to be about 2 mm. Hence the prior art thickness is more than 100 % greater than the maximum thickness of claim 6. Claim 6 is clearly not anticipated. Moreover, Buzza et al. fails to teach or suggest that the skin should be uniformly thick.

Applicants additionally urge that the gel coating of Buzza et al. even if equated with the cover layer of the present invention would still not cause the cited reference to anticipate the claims. As stated above, there is no teaching in Buzza et al. that the gel coating be embedded into the adjacent fiberglass skin and further, there is no suggestion that the fiberglass skin has a roughly textured face as called for by these claims. Consequently, Applicants maintain that Buzza et al. does not anticipate the claimed invention.

Rejections Under 35 U.S.C. §103

Claims 1, 3-5, 7, 8, 10 and 29 stand rejected as being obvious over Buzza et al. in view of Ponder et al. US 6,000,437. This rejection is respectfully traversed.

The Examiner contends that Buzza et al. discloses all limitations of the rejected claims except the composition of the cover layer. It is asserted that Ponder et al. discloses an insulating liner coated with a barrier layer which is applied as a polymer latex component to form an elastically deformable layer

over nonwoven fiberglass. The Examiner further asserts that one would be motivated to modify Buzza et al. by using the polymeric latex coating of Ponder et al. because of an expectation of improved moisture resistance

Applicants disagree with this rationale. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. Buzza et al. is directed to a roof system which provides a "leak-free" surface (col. 1, line 5). Hence there is nothing in the reference to suggest that the moisture resistance of Buzza et al. is inadequate or needs improvement. Also, Ponder et al. is directed to providing a flexible, mechanical barrier layer for an acoustical or thermal insulating gas duct liner. Among other things, the barrier layer prevents insulating material particles from entering the flowing gas stream. Nothing in Ponder et al., however, teaches or suggests that the polymer latex component disclosed therein does or could improve moisture resistance of the article. In brief, the motivation suggested by the Examiner does not exist. Consequently, the references may not be combined.

Applicants further urge that nothing in Ponder et al. anticipates or renders obvious the subject matter of claims 7 and 8. Assuming for sake of argument only that Buzza et al. and Ponder et al. could be combined, claims 7 and 8 would still be patentable over these references.

New claims 30-35 are presented in terms believed to meet pertinent statutory requirements including 35 U.S.C. § 112. Claims 30 and 31 define two layer and three layer composites, respectively, having a core consisting essentially of glass fibers. Neither Hegg nor Buzza et al. anticipate two or three layer composites. Neither of these references disclose a composite having a core of fibers. Claims 32 and 34 are drawn to composites of claims 31 and 30, respectively, which include an outer layer of metal foil, organic film, paper or combination thereof on the face opposite to the cover layer. This feature

also is not taught by the cited anticipating references. Claim 35 relates to a structure of claim 30 which is flexible. Buzza et al. discloses a rigid panel with maximized stiffness (see col. 6, lines 9-14 and lines 53-58 and thus does not anticipate this claim.

For the reasons stated above, Applicants respectfully request submit that the claims as now presented are in condition for allowance. Favorable action is requested in reply.

Respectfully submitted,



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Amended claims, substitute drawing sheets and replacement paragraphs and/or sections of the specification marked-up to show additions and deletions from previous versions are as follows:

One paragraph starting at page 1, line 7:

Batting, boards and other composite products for thermal and acoustical insulation typically include one or more layers of a low density [webs] web of nonwoven fiber or foamed insulating material. Frequently, improved properties and enhanced performance are sought by coating a face of the composite with a cover layer. For example, to increase stiffness, provide puncture protection, or reduce permeability, paper, foil, and/or film is sometimes laminated to the face.

Two paragraphs starting at page 3, line 27:

For better understanding of the present invention, attention is first directed to Figs. 1A and 1B which show a roughly textured substrate coated in the traditional manner. These figures illustrate a representative resilient, porous insulation batting **10** comprising a body layer of a web **4** of nonwoven fibers **6** and a cover layer **2**. For sake of illustration only a few of the fibers that may be present in an actual insulation batting are shown. It is seen that the web is very open and porous due to spacing between the fibers. Also, certain fibers **7** terminate at or near the top surface of the web. These features make the surface textured. The cover layer **2** of cast polymer composition is seen applied to the textured surface of web **4** by a conventional process such as a knife-over-blanket, or floating knife process, utilizing a coating blade **5**. The method of application basically involves depositing a continuous cross machine direction puddle **14** of the cover layer composition in liquid form on the surface of the moving web upstream of the blade. As shown, the web is moving relative to the blade in the machine direction indicated by arrow M. The liquid is usually

very viscous and slowly begins to descend into the upper portion of the web. As the web moves under and in contact with the coating bar, the liquid is forced under the blade and into the upper portion of the web.

As seen in Fig. 1B, conventional coating blade 5 has a straight edge 8 along the full length of the blade in the cross machine direction. This edge is normally disposed horizontally and in contact with the uppermost fibers 11 and 12 of the web. Accordingly, the liquid is scraped into the web to the height of edge 8. Nonwoven fibrous webs usually exhibit some variability in the elevation of the uppermost fibers. Fig. 1A somewhat exaggerates the variation in height of upper fibers 11 in the machine direction and Fig. 1B similarly shows height variation of fibers 12 in the cross machine direction. Downward blade pressure also typically compresses the nonwoven fibers thereby distorting the web locally beneath the blade. This variability is also found in rigid textured surface substrates such as rigid insulation board. After being applied, the liquid is cured to produce a permanent cover layer embedded in the upper portion of the web.

One paragraph starting at page 13, line 9:

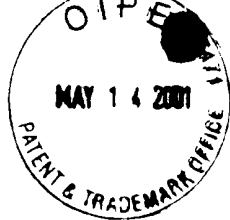
In operation, the uncoated body layer of the insulation material is fed horizontally into the coating apparatus. Uncured coating liquid is deposited on the top surface of the body layer, preferably in a puddle extending across the full machine direction of the body layer. The liquid is confined within the box defined by the side walls of the vertical plates, the coating bar and backing plate, and the body layer. Depending primarily on substrate pore size and liquid viscosity, the liquid will commence to penetrate the surface and seep into the uppermost portion of the body layer while the insulation advances toward the coating bar. Preferably the liquid viscosity is high enough

to prevent the liquid from penetrating deeply into the body layer under force of gravity alone. The ridges of the coating bar corrugations press the liquid into the upper portion of the body layer while some coating liquid remains on the surface and passes through the grooves between corrugation ridges. Upon arriving at the downstream side of the coating bar, the liquid from within the grooves is released to spread over the neighboring areas of the presently wet surface. This produces a uniform thickness of coating over the full surface of the body layer.

Claim 1. (Amended) A composite comprising at least one body layer having a roughly textured face and a cover layer of a solid of a cured liquid cast on the roughly textured face, in which the cover layer has a substantially uniform thickness and is permanently embedded into the body layer to a depth less than the thickness.

Claim 7. (Amended) The composite of claim 6 in which the [uniform] thickness of the cover layer [varies by] has a variation of at most 1 mm.

Claim 9. (Amended) The composite of claim 1 which comprises [a body layer faced with] a second web of a nonwoven, net or scrim fabric on the roughly textured face of the body layer and in which the second web is embedded in the cover layer.



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conversion to glycerol, but also to 1,2,3-trioxanetriol. It may be polymerised by free radical, cationic or anionic mechanisms to polyacrolein. However, the polymer has a complex structure, being crosslinked and containing 10–20 mol% of aldehyde groups. Polymeric condensation products with phenol are useful as adhesives and those with formaldehyde as lacquers.

AC RUBBER Alternative name for anticrystallising rubber.

ACRYL-ACE Tradename for polymethylmethacrylate.

ACRYLALDEHYDE Alternative name for acrolein.

ACRYLAMIDE $\text{CH}_2=\text{CHCONH}_2$. M.p. 85°C . Produced by the partial hydrolysis of acrylonitrile by its dissolution in concentrated sulphuric acid, followed by dilution with water. The resultant acrylamide sulphate is then decomposed with alkali. It is useful for the production of polyacrylamide, for copolymers with *N,N'*-methylenebisacrylamide as chemical grouts and for chromatographic column and electrophoresis materials and with various acrylates for surface coatings. Various *N*-substituted acrylamides, e.g. *N*-methylolacrylamide, are also made from acrylamide.

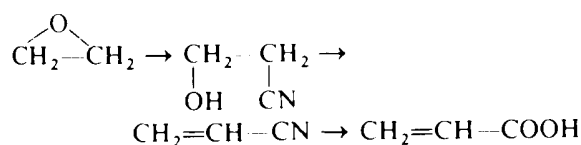
ACRYLATE An ester of acrylic acid, i.e. a compound of structure $\text{CH}_2=\text{CHCOOR}$, where R is an alkyl group.

ACRYLATE RUBBER Alternative name for acrylic elastomer.

ACRYLIC (1) Generic name for a fibre containing at least 85% by weight of acrylonitrile repeating units in its polymer chains. Frequently small amounts of comonomer are also incorporated to improve certain properties, notably dyeability. If more than 15% of comonomer is present then the fibre is described as modacrylic. Examples are Acrilan, Courtelle, Creslan, Orlon and Zefran.

(2) Technological name for polymethylmethacrylate in plastics technology.

ACRYLIC ACID $\text{CH}_2=\text{CHCOOH}$. B.p. 142°C . M.p. 13°C . Produced either by dehydration followed by hydrolysis of ethylene cyanohydrin, itself obtained by reaction of ethylene oxide with hydrogen cyanide:

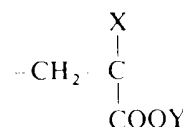


by reaction of acetylene with carbon monoxide and water, or by aerial oxidation of propylene at $400\text{--}500^\circ\text{C}$. Useful as the monomer for polyacrylic acid and as a comonomer in thermosetting acrylic coatings.

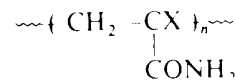
ACRYLIC ALDEHYDE Alternative name for acrolein.

ACRYLIC ELASTOMER (Acrylate rubber) (Polyacrylate rubber) (Polyacrylate elastomer) (ACM) Trade-names: Cyanacril, Elaprim AR, Hycar, Krynac, Lactoprene BN, Lactoprene EV, Paracril, Thiacyrl. A rubber based on a polyacrylate, usually polyethylacrylate or poly-*n*-butylacrylate. The former has the better oil resistance but poorer low temperature resistance than the latter. The vulcanisates show better high temperature resistance (to about 200°C) than most rubbers and also good oil resistance. The polymers may be crosslinked by heating with peroxides or with alkali or, better, through reactive sites on a suitable incorporated comonomer. Usually about 5% of 2-chloroethylvinyl ether, vinyl chloroacetate or allylglycidyl ether may be used as the comonomer. Better oil resistance combined with good low temperature properties are obtained by the incorporation of 20–50% of an alkoxyacrylate comonomer such as ethoxy- or methoxyethylacrylate.

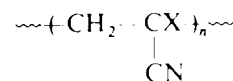
ACRYLIC POLYMER A polymer with repeat units which can be considered as derivatives of acrylic or of a substituted acrylic acid, i.e. containing units of the type



where, most commonly, X = H (acrylic acid derivative) or X = CH_3 (methacrylic acid derivative). The most important group of such polymers is the esters, both the polyacrylates and the polymethacrylates, where Y is an alkyl group. Other important polymers are the acrylic amides



and the nitriles



A wide range of other acrylic ester polymers have also been investigated, including alkoxyacrylates, cyanoacrylates, glycol dimethacrylates, α -chloroacrylates, hydroxyethylacrylate and methacrylate. Technologically, acrylic polymers are useful in a wide range of applications, individual members or their copolymers being important as plastics (especially polymethylmethacrylate), fibres (polyacrylonitrile), rubbers (acrylic elastomers) and adhesives (anaerobic and cyanoacrylate) and as thermoset coatings (usually complex copolymers). Acrylic monomers enter readily into copolymerisation with each other and with other monomers, so a wide range of copolymers has been investigated. The monomers are readily polymerised by free radical polymerisation, although they are also susceptible to anionic polymerisation.

ACRYLITE Tradename for polymethylmethacrylate.